

Claims

- [c1] 1. A method for reducing self sealing flow in a combined cycle double flow steam turbine, the method comprising: providing a brush seal in a packing ring of a packing ring assembly at either end defining the double flow steam turbine.
- [c2] 2. The method of claim 1 wherein the step of providing said brush seal comprises providing said brush seal configured to be at least one of flexible and compliant to limit steam flow variation by absorbing at least one of manufacturing variation, installation variation, and misoperation of the turbine.
- [c3] 3. The method of claim 1 wherein the step of providing said brush seal comprises disposing each said brush seal around a low pressure (LP) rotor end of a rotor disposed in an LP turbine section of the turbine.
- [c4] 4. The method of claim 3 wherein the step of providing said brush seal comprises providing each said brush seal in contact with said rotor in at least a steady state operation of the steam turbine.

- [c5] 5. The method of claim 4 wherein the step of providing said brush seal comprises providing each said brush seal including a plurality of metal bristles to an extent dependent on a diameter of said rotor, said plurality of metal bristles configured to ride against said rotor to create a seal therebetween.
- [c6] 6. The method of claim 5 wherein the step of providing said brush seal comprises providing said metal bristles creating a seal with an effective radial clearance between said packing ring assembly and said rotor between about 0 to about 5 mils.
- [c7] 7. The method of claim 5 wherein the step of providing said brush seal comprises providing said bristles configured to be at least one of flexible and compliant to limit steam flow variation by absorbing at least one of manufacturing variation, installation variation, and misoperation of the turbine.
- [c8] 8. The method of claim 1 wherein the step of providing said brush seal comprises providing said disposing a brush seal into a packing ring includes disposing said brush seal into an industry standard packing ring.
- [c9] 9. The method of claim 1 wherein the step of providing said brush seal comprises providing two brush seals dis-

posed at said either end defining the double flow steam turbine.

[c10] 10. The method of claim 9 wherein the step of providing said brush seal comprises providing one of said two brush seals disposed in a vent ring of a packing casing and the other disposed in a seal ring of said packing casing.

[c11] 11. An apparatus for reducing self sealing flow in a combined cycle double flow steam turbine, the apparatus comprising:
a turbine housing;
a rotor rotatably disposed within said turbine housing;
a packing ring operably secured to an inner surface defined by said turbine housing at either end defining the double flow steam turbine, said packing ring extending radially inwardly toward said rotor; and
a brush seal disposed in said packing ring.

[c12] 12. The apparatus of claim 11 wherein said brush seal is configured to be at least one of flexible and compliant to limit steam flow variation by absorbing at least one of manufacturing variation, installation variation, and misoperation of the turbine.

[c13] 13. The apparatus of claim 11 wherein each said brush

seal is disposed around a low pressure (LP) rotor end of a rotor disposed in an LP turbine section of the turbine.

[c14] 14. The apparatus of claim 13 wherein each said brush seal is in contact with said rotor in at least a steady state operation of the steam turbine.

[c15] 15. The apparatus of claim 14 wherein each said brush seal includes a plurality of metal bristles to an extent dependent on a diameter of said rotor, said plurality of metal bristles, said plurality of metal bristles configured to ride against said rotor to create a seal therebetween.

[c16] 16. The apparatus of claim 15 wherein said metal bristles create a seal with an effective radial clearance between said packing ring assembly and said rotor between about 0 to about 5 mils.

[c17] 17. The apparatus of claim 15 wherein said bristles are configured to be at least one of flexible and compliant to limit steam flow variation by absorbing at least one of manufacturing variation, installation variation, and misoperation of the turbine.

[c18] 18. The apparatus of claim 11 wherein said disposing a brush seal into a packing ring includes disposing said brush seal into an industry standard packing ring.

- [c19] 19. The apparatus of claim 11 wherein two brush seals are disposed at said either end defining the double flow steam turbine.
- [c20] 20. The apparatus of claim 19 wherein one of said two brush seals is disposed in a vent ring of a packing casing and the other disposed in a seal ring of said packing casing.
- [c21] 21. A method for reducing self sealing flow in a combined cycle double flow steam turbine, the method comprising:
sealing both ends defining the double flow steam turbine with a brush seal in a packing ring of a packing ring assembly at either end defining the double flow steam turbine.